Vol. IV. No. 6. June 15, 1907.

THE

PSYCHOLOGICAL BULLETIN

THE PSYCHOGENIC FACTORS IN THE DEVELOPMENT OF PSYCHOSES.

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If we look through the text-books on psychiatry or even such a work as that of Toulouse which treats only of the causation of insanity, we cannot help being impressed by the fact that, although mental causes may be discussed at considerable length this is usually done, one might say, in a perfunctory manner and without full appreciation of their importance. In a rather one-sided interpretation of the dictum: 'mental diseases are brain diseases,' the conception is tacitly implied that the brain, in mental diseases, must be the seat of chemico-physical or anatomical changes, which only secondarily can lead to mental abnormalities; and consequently there is in the air the idea that we have to look chiefly for physical causes of insanity, or at any rate, for mental influences only in so far as they act through the medium of physical deviations. In reality it is impossible to gain a safe theoretical standpoint and it is wise to keep one's mind open for facts; and, if theoretical considerations make us overlook these, it is time to free ourselves from generalizations which now, at any rate, are no longer especially helpful, whatever purpose they may have served in earlier times. As an outcome of the tendency above mentioned we find a marked inclination to explain symptoms as much as possible on a localization basis, as in the conception, *e. g.*, that hallucinations are irritative focal symptoms. And I think we are not mistaken if we regard as arising from a similar ground-work the desire to find one general disorder (nota bene not a general principle) as explanation of a psychosis, a general disorder which can be attributed to a diminution, or increase, or a perversion, of certain brain activi-

This number, dealing especially with psychopathology, has been prepared under the editorial care of Dr. Adolf Meyer.

ties. To this group belong such theories as the explanation of paranoia on the ground of a defect of apperception (Berze), or of a general change in the emotional tone (Specht); or such theories as Janet's diminution of mental tension; perhaps also to a certain extent the theory of dissociation of the noöpsyche and thymopsyche (Stransky) and many others, which leave out the issue of *development* of symptoms.

I have, of course, no desire to discuss here the relation between the chemico-physical processes of the brain and the mental functions. I wish only to point out certain tendencies which have of late made themselves felt in psychiatry and according to which, in some diseases, the psychogenic factors are given more weight in the development of mental deviations than has been customary. This tendency is not based upon theoretical considerations but upon practical experience, gained from analyzing disease symptoms and the lives of patients, their mind habits, their struggles and their mental undercurrents; and comparing these pathological deviations with variations within the breadth of normal mental activity.

In spite of the general tendency to neglect mental causes there is one disorder in which the mental causes always have been pushed more to the foreground, namely, the anxiety melancholias which occur more especially in advanced years. The reason for this fact is plain enough. The central feature of the clinical picture is here strikingly in accord with the mental causes so frequently found, the anxiety and uneasiness is the result of circumstances which naturally would produce fretting in anyone. The conflict, therefore, which existed before the breakdown and the reaction to this conflict, are still present in the disease itself. That such a clear relation is not observable in other conditions is evidently an important reason for the relative disregard of mental causes in psychiatry.

We owe to Freud the impulse towards the appreciation, and the demonstration of principles in normal and abnormal life which help us to recognize in other psychoses similar closer relations between cause and effect as we do in the anxiety melancholias, above mentioned, with the distinction, however, that these relations are here often much less transparent.

It has been shown that internal conflicts, longings, and the like, influence mental processes in various ways, and this without any interference of will and often without our becoming conscious of the source of the influences. Freud has demonstrated that such common experiences of our everyday life, as the forgetting of names, words, or incidents; also slips of the tongue or pen, mistakes in reading,

thoughtless acts; or again the random selection of names or figures — acts which are apparently accidental or purposeless and which occur when the attention wanders — may have a distinct connection with mental trends associated with marked affects. He showed that they are not accidental happenings, but that, when we trace them back to their origin, we may find at work either instinctive attempts to forget unpleasant experiences or associations or instinctive attempts to work out in other ways our desires. In other instances such mistakes are evidently determined merely by trends of thought which have been recently prominent in mind, without the character of either suppression or working out of desires being at all in evidence. Just as in conscious activity, reminiscences are called up by many associations, so may here undercurrents be called into action from all sorts of avenues but without our becoming conscious of them.

Jung has found that the influence of such undercurrents can be demonstrated in the results of association experiments in which stimulus-words which touch such undercurrents produce either a delay of the reaction or various qualitative peculiarities in the associations evoked. This he interprets on a similar principle of suppression. Memories which are connected with strong feelings together with a greater or lesser number of their associated ideas are submerged or inhibited, consequently ideas which are associated with undercurrents are not supplied with the same readiness as indifferent thoughts. To a certain extent this may also be explained by an inhibiting influence upon mentation which undercurrents may exert in the same way as actual affectful experiences, with the distinction that in the case of the undercurrents the idea remains below the threshold of consciousness. These studies of Jung have therefore confirmed some claims of Freud and have given us a method for demonstrating experimentally the existence and the nature of undercurrents, and to a certain extent for gaining an idea of their intensity and abundance.

In the mental tendencies thus far enumerated certain instinctive attempts at getting away from the unpleasant have become evident. Many other tendencies of a similar kind can be shown to exist. Bleuler has pointed out the fact that, if we read over our diaries of former days, we find that our recollection has changed the events in a manner which suits our desires better than the actual occurrences as recorded. We may also mention the fact that we have a tendency to instinctively blame others if anything we do goes wrong, because we wish to rid ourselves of the discomfort thus created; or, the many substitutive activities to which we resort in order to relieve unsatisfied longings; or day dreaming, etc.

Very important in this connection are our dreams which Freud has studied extensively. In his analysis of dreams he became convinced that the dream is not merely 'a somatic process which manifests itself in the mind,' nor that in the dream state, some sets of ideas are asleep, others not, etc., but that we dream only of things which concern us deeply. His study brought him to the conclusion that the dream developments represent a fulfilment of wishes, that is, on the one hand, a satisfying of longings, and on the other a ridding ourselves of unpleasant experiences or a conversion of them into pleasant ones. The reason for this Freud sees in the sleep-guarding function of dreams, which have to suppress the disturbing thoughts or rob them of their disturbing elements. Whatever we may think of Freud's generalization he certainly gives excellent examples in his book in which the principle of the fulfillment of wishes is very plausible. Of great interest in relation to psychiatry is also the fact that in dreams the undercurrents appear much disguised in the garb of peculiar, and at first sight unrecognizable, symbolizations.

We see then in all these examples taken from normal life how ideas which deeply concern us influence our mind in a manner which is not yet generally appreciated. We have found that such ideas, conscious or unconscious, may exert an inhibiting influence upon the mind and it has been shown that there exists various automatic mechanisms or tendencies, or whatever we may call them, which tend to bring about a certain adjustment to our difficulties. We shall see, however, that these tendencies are not without their dangers and that it is in this direction that pathological deviations may develop. The *essential* means which the normal individual uses to get square with conflicts are of a different sort. I refer to the many healthy mind habits and reactions such as the formation of healthy interests which allow us to turn away from our own difficulties, or a sense of correct values, or the habit of clear thinking and clear feeling, or an aggressiveness which shapes conditions around us to a certain extent, or a wholesome unburdening, and many others; in a word, all those healthy mind habits in which the normal personality asserts itself and counterbalances the formation, growth and accumulation of undercurrents.

If we now turn to the pathological conditions we find the same principles at work, only in much exaggerated form. Freud has shown what a great rôle the mechanism of displacement, that is, of forgetting or suppressing unpleasant memories, plays in both hysteria and obsessions, and how the suppressed undercurrents influence the mental activities in a great variety of ways. Although the disturbing memory

may be wholly forgotten so far as the facts are concerned, the affect, the fear, or the depression or the uneasiness may persist or crop up and be then associated with ideas and happenings, the content of which is curiously incongruous with the disturbing emotions. Or peculiar substitutive activities may be instinctively chosen either as a result of suppressed or conscious disturbing factors. All this may be comparatively tranparent or it may be covered up under the guise of symbolisms. Such activities are then apt to occur with imperative force. In this connection the example of a boy, a patient of Freud's may be mentioned, who, every night on retiring had to go through a complicated set of actions. These, it was found, had a clear relation to a sexual traumatism which was submerged and the actions represented means of defence against such an occurrence. It was an attempt, therefore, to find relief from the effects of the disturbing experience. In hysteria the suppressed complexes of ideas of this kind may also manifest themselves in various ways. Ricklin described a case, for example, in whom many physical symptoms which otherwise could not be accounted for were, under hypnosis, traced back to various experiences against which the patient's feelings revolted. It was then found that the relation between the symptoms and these experiences was a perfectly evident one, but the patient herself was unable to account for the symptoms or made use of subterfuges very much in the same way as a person acting out a posthypnotic suggestion does. Similar conditions are often found. The symptoms may be more or less persistent or may only appear when the undercurrent is somehow touched and when the actual recollection is kept from rising above the threshold of consciousness; then the more indifferent, more admissible physical symptoms, or ideas which are sufficiently disguised not to betray the undercurrents, manifest themselves. In the same way delusions, hallucinations, deliria may appear in hysteria and here, as in other psychoses, the range of possibilities which, one might say, is only bounded by the possibilities of imagination, is very great and accounts for the multiplicity of symptoms. The principle often seems to be that the symptoms are the direct result of suppressed, or conscious conflicts and longings, or often represent instinctive, not of course voluntary attempts at getting away from the unpleasant, or seeking that which gives ease or fulfils longings. A girl, recorded by Bleuler, after having in vain waited for her lover who deserted her, got into a state of delirium in which she imagined that the lover had arrived, hallucinated the occurrences which represented this fulfilment of her desire and interpreted the surroundings in accordance with it. Traumatic

hysteria has in part been explained as a more or less unconscious desire to be sick in order to obtain the compensation and a similar explanation has been given to the peculiar simulation of insanity called the Ganser symptom-complex. Just as sets of memories with their associations may be thus suppressed and exert an influence upon the conscious mind, so may larger parts of the mind be split off and dominate more or less fully the activities of the personality.

I may here mention a case who in reality belongs to the group of dementia præcox, but whose delusions represent in such a clear manner a pathological attempt at getting square with a conflict that it may well serve as an illustration of the possibilities which we have to expect. I will describe only a few of the features of the case. The patient was a married woman who became infatuated with another man than her husband. She blamed herself severely for this and finally, as a result of the conflict caused by her infatuation and her sensitive moral nature found a relief in the substitutive mental trend of having a mission to show the world how to live a pure life, while at the same time the two incompatible personalities, the husband and the man with whom she had become infatuated became fused into a mystical combination of which she spoke in vague terms as 'two in one.' She presented, moreover, what appeared to be a purposeful vagueness or shirking of any reasoning in her utterances and thoughts referring to her mission and her conflict, whereas in other respects she was clear enough. The secondary delusions of grandeur, in paranoic states, evidently find a ready explanation upon the same principles.

Bleuler has claimed that if we carefully investigate the histories in cases of paranoia (he limited himself to the Kraepelinian type) it is possible to show how here, too, affectful experiences and conflicts play an important rôle in the genesis of the delusions and how such ideas and complexes of ideas finally dominate the mind so that many occurrences are of necessity associated with the predominating ideas and a fictitious relation is brought about which gives rise to the so-called delusions of reference. He points out, moreover, how the delusions are not different from errors of everyday life nor formed upon different principles. My own experience with various other types of paranoic states shows this to be true in them as well. One often finds that the analysis of the clinical picture leads one back into the normal period of the personality in which we encounter the same sensitiveness on certain matters, the same disharmonies, and conflicts which in further development have become dominant and have given rise to various results which have their prototypes in normal life. Indeed, it is the

paranoic states (the term being used in a wide sense) which furnish a large material in which only the principles discussed in this review give us the key to the situation.

Dementia præcox is one of the most difficult problems in psychiatry and it will be a long time before we shall be able to fully understand the symptoms, and the principles which underlie them. Nevertheless, there are early and comparatively transparent cases in whom the same mechanisms seem to be at work. Jung in his remarkable work upon the psychology of dementia præcox has shown us how so many of the symptoms may thus be explained, as, for example, the 'blocking' in its various forms, the hallucinations and delusions, the delirious phases, a part at least of the disproportion between the affects and ideas, the substitutive activities, etc., and he has even made it very probable that the peculiar speach confusion may be largely dominated by a few sets of ideas which manifest themselves in various symbolizations, substitutions, fulfilment of wishes, etc. There is of course much in dementia præcox that remains unexplained, and it is difficult as yet to see the reasons for the grave deterioration. Nevertheless, the results of Jung, and the fact that we find transitions from the more transparent paranoic states to the graver deteriorations makes it probable that many features of this disease belong to the category of phenomena we have here been discussing, especially when we consider the important principles to which Meyer has called attention and to which we shall presently turn.

A word should be said about the methods by which the demonstrations of these mechanisms are obtained. In many instances the connections between cause and effect are fairly clear and simple in others the association experiment will supply helpful facts or again it is necessary to resort to hypnosis or modifications of hypnosis, or to Freud's psychoanalytic method. The latter has been severely criticized. It is natural enough that one feels a certain uneasiness about a method which may lead one into a realm of uncontrollable explanations, and it is after all not impossible that if one goes through a sufficiently large number of associations one is bound sooner or later to arrive at thoughts which are connected with deep feelings. But it would be very unjust and unwise to reject a method, and conclusions which only in part depend upon it, because the method has to be handled critically.

From a somewhat different side Adolf Meyer has attacked the problem of mental causation, more especially in connection with dementia præcox. He has laid especial stress upon the seriousness of using inadequate means for getting square with difficulties in life

and has insisted upon the fact that, when we are able to obtain an accurate anamnesis of patients suffering from dementia præcox, we find in the 'normal life' an excessive use of reactions which bring a certain danger with them. Some of these reactions have often been referred to in this review, namely, the partial suppression of events, the substitutive activities and the like; in addition should be mentioned brooding, or more serious reactions, such as, empty harping, tantrums, rattled fumbling, or grossly imaginative substitutions, in other words means which do not adequately square up matters, and which do not give a feeling of completion. It is these reactions that such individuals use excessively, at the expense of more hygienic ones to which we have above referred as healthy mind habits. According to Meyer, therefore, the symptoms, in well observed cases, stand out as necessary results of small beginnings. "The general principle is that many individuals cannot afford to count on unlimited elasticity in the habitual use of certain habits of adjustment; that instincts will be undermined by persistent misapplication, and the delicate balance of mental adjustment and of its material substratum must largely depend on a maintenance of sound instinct and reaction-type." "Mind like every other function, can demoralize and undermine itself and its organ and the entire biological economy." It need hardly be said that these principles upon which Meyer insists are of the utmost importance, not only in dementia præcox, but in other conditions as well, such as paranoic states, psychasthenic conditions, depressions, etc. The difficult problem of disposition which, of course, constantly asserts itself in the study of all these diseases, which Freud attempts to solve for hysteria in his 'Sexualtheorie' and which Bleuler discusses to a certain extent, in his lucid manner, receives the most important help from these principles put forth by Meyer.

If in all that has been said the purely mental factors have been pushed to the foreground, it is of course not implied that physical influences may not enter in varied proportions into the causal constellation as well. There is no hard and fast line on the one side of which physical, on the other mental causes are at work, but there are evidently diseases, or cases, in which the constellation of causes is dominated chiefly by the one or the other. But all factors have to be taken into consideration and it is the task of the future to show what decides the symptom picture, the course and outcome, in so far as the mind habits, the forms of reactions, and the physical factors are concerned.

There is much in this recent development that is still under dis-

cussion, but the essential feature seems to me to lie in the strong evidence that there are certain diseases in which conflicts, and the reactions of the personality to these, stand in the foreground of the clinical picture and that in those the anatomical or chemical changes, or indications of them, have thus far not furnished much help for the understanding of the disease, whereas in other diseases the conditions are reversed. We might perhaps say that, in the former, mental undercurrents break through to the surface, whereas in the latter they may be merely uncovered by general disorders. The opposition seems to me to be due chiefly to the fact that the essentials of the trend are not clearly recognized and that details are discussed instead of the broad principle.

A greater accuracy in, and a better appreciation of the importance of, the study of mental causes and of the personality and its reactions opens up a new field in psychiatry in which undoubtedly the questions of prophylaxis and treatment will have an important share.

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Misconceptions at the Bottom of 'Hopelessness of all Psychology.'

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The last publication of Möbius[1] gives in his usual very clear and smoothly readable style an excellent sketch of that dogmatic dualistic schism between psychology and natural science which is the bulwark of those who have to make a fundamental contrast between biology as physiology or physico-chemical investigation of living organisms, and a psychology serving as the grammar of the Geisteswissenschaften. "As far as man can be perceived, he belongs to nature; as he thinks and feels he is something different from nature." Since science has only a physical basis, it cannot be applied to mental life. Such a statement would almost sound archaic if we were not aware of the fact that after all it voices the opinion of many of the foremost — not to say the best — thinkers of the day.

Möbius shows up mercilessly the barrenness of our formal psychology and the bulk of laboratory work, and sees in 'metaphysics' the only salvation, the only spice, that will make psychology acceptable. He gives an interesting critical review of the methods of animal psychology, the psychological rationalism, evolution, the difference of man and animal, the instinctive processes, the sizing up of the sum of instincts (= the character), and the competition of the instinctive processes, perception, voluntary life, thinking, feeling, discrimination, memory, conception, the notion of the unconscious, and importance of unconscious processes — pages of most suggestive and entertaining contemplations; and finally, after having shaken one sham support of traditional psychology after another, and after having given the reader a better taste of the meat of psychology than I have ever seen offered in so small a scope, he leads him into — idealistic monism. The 69 pages are full of valuable material and in many ways an admirable summary of some of the most vital topics of a psychology and really the testament of a serious worker and thinker. There is but one disappointment, viz., that Möbius did not apply his keen critical maxims to his own way of getting square with his conception of science and with what he calls the 'hopelessness of all psychology.'

Möbius gives excellent advice. "The chief duty of a psychologist seems to me to be that he use the simplest language, avoid traditional

[1] *Die Hoffnungslosigkeit aller Psychologie.* P. J. Möbius, Halle, C. Marhold, 1907.

formal terminology like poison and distinguish plainly between what is experienced and what is mere inference" (p. 14). Why not apply this same maxim to the inferences as well? Why not say: "The first rule should be to use the plain man's good sense and to go at things for what they are worth, with as little preconceived notion as possible?" Möbius like so many others starts out with assumptions concerning nature and mind which we do not need, which merely embarrass, and at once give one cold shivers; which remain to be proven, unless we already become convinced on the way of their uselessness and futility. He is not satisfied with a biological view-point, and swells the problem of the essence of mind to a complexity out of touch with all experience and therefore wishes it kept out in a special sphere. We need not wonder at his final resignation with the saltum mortale into panpsychism: the invention of souls for every cell, for every atom, in order to make intelligible the existence of — what he claims to *know* as a soul in himself and *in himself exclusively!* Such psychology is hopeless and, fortunately for us, can be spared readily. It cannot be a topic of science in the sense of systematized experience.

With many physicians I have long revolted against many of the assumptions which seemed to be forced upon one in studying mental life. Many of these are the same as those which Möbius discusses. But my result has been different from his.

The psychopathologist is very directly confronted with mental activities, since their miscarriage is often enough the center of the disorder for which the patient seeks his help. Certain unusual mental events appear and others fail to take place, and the result is an inability to meet the demands which would be met by normal mental reaction. Like all other *biological* provisions or developments, the mental mechanisms meet, or fail to meet, definite kinds of biological demands and the legitimate question is: what is the type of demands and what is the mechanism or type of reaction that meets it? Further, since there are evidently degrees of efficiency in this function as in all others, we legitimately ask: which are the conditions for the proper working of this function and what are the ways of influencing it if it threatens to miscarry?

In our daily life we use this attitude as a matter of course; and as soon as we enter psychology, whose business it should be to deal with these questions, and to guide us, should we surrender it? As soon as we do, psychology becomes powerless, merely because it pays more attention to extraneous contemplation than to its direct issues.

The effect of this is disconcerting to physicians and to others who should have some training in the accurate, and above all things, purposeful, use of psychology. Instinct usually shrinks from panpsychism as a working hypothesis. The result is that with all the advances in laboratory psychology it is still impossible to convince physicians of the necessity of introducing psychology into a medical curriculum. They are confused and bewildered by the authority of those who want to make psychology hopeless and prejudice its rôle by claiming that psychology occupies itself merely with the abstract 'subjective' something which cannot be called activity or function or anything belonging to the domain of biology, and that it is a sphinx in matters of practical issues; they find singled out a certain aspect of the possible problems and are asked to turn over the rest to physiology, without being allowed to realize that to do this demand justice, physiology must extend into — psychology at its best, not merely laboratory-psychology, but an extension and deepening of the way in which we use our *own* mental activity *and* that of others in practical life.

As soon as the physician sees a mental condition pass from the normal and justified reaction into one demanding his attention, he is apt to surrender his common-sense attitude, considers it unscientific to view the abnormal mental trend as a genuine but faulty attempt to meet situations, an attempt worthy of being analyzed as we would analyze the blundering of a distracted pupil, or the panic of a frightened person, or the bungling of one who reacts poorly in trying to meet an unusual situation. Instead of analyzing the facts in an unbiased way and using the great extension of our experience with mental efforts to get square with things and with one's self in states of dream or under dominant preoccupations, in states akin to hypnotic dissociations or a faulty development of interests and inadequacy of habits, they pass at once to a one-sided consideration of the extra-psychological components of the situation, abandon the ground of controllable observation, translate what they see into a jargon of wholly uncontrollable brain-mythology, and all that with the conviction that this is the only admissible and scientific way. If there were more of the unprejudiced attitude as that shown in the course of psychology outlined by Professor Sanford, more training to *observe ordinary events* correctly, and a demonstration that observation must be accurate according to demands, and that accuracy is not primarily a question of instruments, physicians might feel less hopeless, and less inclined to use that delightfully impersonal and non-committal

emphasis of the physical disorders and of heredity, where a sizing up of the whole situation (for instance, the problem of the whole family), the mental working of the patient and his way of meeting the situation *as well as* the regulation of his physiological mechanisms, should receive an unbiased and unexpurgated consideration.

To divest psychology of its dynamic interest is making it hopeless. Facts such as those reviewed by Dr. Hoch will do most to convince. There are, however, some obstacles which are suggested by the attitude of Möbius, discussion of which may break down some ruts of thought which often prove fatal at the outset of a discussion of even the plainest facts, and for which there are helps worthy of a brief formulation.

The prime difficulty is a fundamental dogma concerning science which leads Möbius at once to divide man into what belongs to nature and that which transgresses it. Such a division brings serious embarrassments and is contrary to the trend which sees the domain of *science* in the task of *unbiased systematization of experience.*

According to Möbius natural science conceives everything from a physical view-point and it knows only of physical explanations. "Physics may give up the attempt at explanation, but it cannot replace a physical by a psychological explanation." On this ground he even wants physiology to eliminate the concept of activity. He accepts such a definition of reflex as 'all reactions or answers of a living being to a stimulus,' but then at once proceeds to expurgate these reactions of an essential part, the 'inner experience' which 'does not really concern natural science.' "All that which goes beyond experience is metaphysics, and this holds for all psychology as soon as it claims general validity, and especially for animal psychology."

This assumes an absolute division of experience into physical and mental, such as seemed justified as long as biology formed a sort of uncertain go-between or 'cela va sans dire,' and as long as one was not willing to give the benefit of doubt of possible artificiality to some of the embarrassing constructions and cul de sacs to be discussed point for point.

1. From the practical view-point we must eliminate as fruitless the term metaphysics as an obviously arbitrary weapon of argument.

2. We must surrender sham *unity* in science and replace it by pluralistic *consistency.*

3. This consistency can be attained in a nondogmatic *hierarchy of systematizations* which allows us to maintain a sincere respect for the world unsystematic as it may appear, and for the order of the things

and events as they actually occur. The world is too pluralistic to be grasped by but one simple formula without doing serious harm to our capacity of scent for error and our appreciation of the actual combition of the things in the real experience which science must not try to ignore, but in which it singles out *principles of regularity*.

4. The fundamental change in the modern attitude is the elimination of unprofitable pondering about the final and absolute nature of 'things' and the turning to *inquiry into events* and their actuality. The theory of atoms is to us the theory of actual and possible relations of qualitatively different materials, and not a means of an unnecessary revisualization in a garb of exclusively quantitative features. The theory of molecules and the various forms of physics, the theory of organization and of inner activities or adjustments (of physiology) of the biological objects of experience, are all dealt with with less imaginative substitutions for what we at last enjoy again to see and accept in exactly the form which they have in our experience.

Our concern is with the events or 'doings,' not with the being or final essence, and therein lies the great difference between the old frame of thought and the modern one. We study the relation of occurrences and experiences and among them we find, on exactly the same ground as the rest of experiences, the occurrence of events and activities which we call mental and which we specify on account of certain specific features of working and the specific rôle in the economy of the individual and the world generally.

The fundamental principle of the non-dogmatic attitude is the adherence to a series of non-prejudicial queries which hold for all events worthy of inquiry:

1. What is the fact in question? (With this query we do not wish to penetrate into the absolute essence of things, such as is the child's desire and that of the philosophy of the past — but the answer is sufficient if it gives us such a characterization as will distinguish the object of inquiry from similar possible topics.)

2. What does the event or fact lead to, or how does it react to tests?

3. What are the conditions for its existence or course?

4. How can it be influenced, and what is our attitude to the event?

These queries cover all the issues of practical life and of science, whether we deal with a problem of physics or chemistry, or the simplest or most complex problem of biology or psychology, or sociology. The result is 'science,' if it is consistent with the systematized experience of physics, chemistry and biology, and especially if

it is consistent with the syllogism of the modern mind: the laws of experimental test. In this *physics* is most fundamental, but not all-embracing. It deals excellently with a certain range or aspect of facts and has within itself a certain hierarchy of 'physical sciences.' Its laws are further in harmony with those of *chemistry*, but they do not *express* all the facts of chemistry, inasmuch as they eliminate the factor of *kind* of substance, so essential to chemistry. Physics and chemistry furnish a scientific basis of *biology*, but at their present stage they do not exhaust the problems of organization, and the adaptation of the organization in strata of biological function of widely different complexity; and finally the strata of *ultra-biological relations* such as are thought of in the terms of soul and God, in logic, etc. We need not wonder that the relations of the mental domain were long singled out and presented in a terminology of their own. Working hypotheses had to be made long *before adequate facts were available*. We need not be surprised either over the difficulty of harmonizing all the old and new data into one whole and the transformation of the various schemes of simplification: the dualism, and the trinitarianism of many physicians who think of body and mind as subserving the higher ultra-phenomenal part, the soul; and the gradual evolution of the thought that the body is deciduous as compared to the soul, to a growing realization that the same holds for mind, and that mind as we know it should not be identified with the essence of soul, since it is changeable with the body, nor with the essence of things as in panpsychism.

5. The next problem is the *relation between mental events and the other biological types of function*, *i. e.*, circulation, respiration, metabolism, digestion and elimination, regeneration and the neuro-muscular regulations.

The range of mental functions is approached in complexity only by that of the chemical metabolism, but for the sake of simplicity we take as a paradigma of comparison the function of respiration. The essence of respiration as far as we know to-day is the unitary *principle* of aeration of the blood. Nobody would, however, think to eliminate from the practical study of respiration the consideration of architecture of the lung and respiratory tract and of the neuro-muscular mechanisms on which the function rests. Among the *mental* functions we find a wide range of types, determined by the extent of participation of various parts of the organism, as in sensation, in activity, or in the more intrinsically cerebral and 'subjective' processes. The complex coördination of the mental reaction types at any giving mo-

ment is one of the striking features which has led to the concept of the stream of consciousness with which, for all practical purposes, we would, as in the process of respiration, include the whole range of pertinent collaboration of the sense-organs, nervous system, skeletal and vascular muscles, glandular activity, etc. It is a *specific mode of collaboration*, the final essence of which is as yet as unknown as the essence of all things, but concerning the working of which, and the conditions for its work, and the effects, we have a fair stock of working knowledge, which we use adequately in everyday life, and increasingly so under unusual or 'abnormal' conditions without changing our attitude, or attempting to establish a parallelism of a physical and a mental 'side.'

6. At this point the plain man is easily disconcerted by a number of products of insufficiently checked reasoning, either residuals of pre-biological, or legitimate topics of ultra-biological considerations. The first is the question of the essence of mind. Instead of a functional qualification distinctions have been made by emphasis of what is called the *subjective nature of mental activities*. In logic we have a right to make an absolute contrast between subject and object. In the interpretation of events we can, however, only give a relative application of the logical principle according to the extent to which the subjective or objective aspects balance one another. If Möbius tries to remove from biology generally the principle of activity he deprives us of a very useful conception, merely for fear that it might be taken not in the sense of the logic of facts, but in an absolute sense which only holds within abstract logic. The concept of activity is one of the most useful and harmless formulas of expression of events, emphasizing the importance of the rôle played by the 'subject.' Where this rôle is slight we usually speak merely of objects. Where it is more important, the 'subject' is singled out for the rôle it plays in the event and in the grammatical construction. The central position of the mental functions within an individual is apt to give a special prominence especially to the volitional processes; and since in pre-biological days the contrast of volitional elements and physical 'execution' was unhesitatingly taken as one of causative principle and effect, and mind was made the prototype of subjectivity, the connotation of an absosolutely subjective agency became a natural corollary. To this is added the fact that among mental activities some can become the knowers of others which approaches the simplicity of the absolute subject and object of logic. In this respect we keep clear of misunderstandings if we stand by the above definition of 'activity,' that it expresses the preponderant rôle of the subject in any event. A stone

plays its rôle in the stream of the world according to its qualities and make-up, essentially as an object and according to its capacity of *resistance*. It resists, falls, hits, and 'acts' for what it is worth. The seed of a plant plays its rôle with a greater range of possibilities depending on its organization. It is to a less extent a mere object of the forces of the surrounding world. In the animal series the inner working of the individual reaches an increasing development to which we give expression in the term of function in the sense of activity. Among these functions the mental activities have the leadership of conduct and on account of the importance in the religious and ethical evolution, this kind of inner working became characterized as 'absolutely subjective,' as we have seen, with only relative justification. Since the logic of facts knows of no absolute activity there is no need of being disturbed by the term.

Another spectre or product of unchecked logical consistency is that of solipsism: 'You can only know and feel yourself.' 'The mind is beyond human ken,' etc. The whole conception is one of those conclusions which are very perplexing but which at once lose their alarming trait if we consider practically the extent to which we can act on the knowledge of the mental states of others and all that without an attempt to translate the facts into a terminology different from that used in mental reactions generally, including our own. We know mental events best in terms of mental events, and use them in our experience according to the effects they produce. That presupposes of course that we do not make artificial and unessential subdivisions, between a subjective something and its physical manifestations.

Hand in hand with this goes the puzzling thought: how can mind be evolved from matter? The puerility of this question is obvious. We admit that we do *not* know *why* certain combinations of molecules of definite kind form a constellation which implies with necessity the phenomena of electricity. It is a fact which we accept as a fact of experience. Those who are trained to make the dualistic division between mental experiences or occurrences, and physical ones, merely *assume* that they can understand *why* such constellations of certain metallic stuffs as the above mentioned, go with the phenomena of magnetism, others with the phenomena of electricity, etc.; and they refuse to see that the biological events of the order of mentation are no doubt in a similar way dependent on sufficient organization and constellation of an organism and that the coexistence of these constellations with their manifestations is a fact which we have to accept as merely *one instance* of the general problem of qualitative differentiation of the universe. The question why

is mind mind, and just what it is, can be as little answered as what gold is, and why it is and why it should be so. Consequently, the impossibility of getting an answer to the puzzle — what makes mind mind, and what the relation is between the underlying physical constellations and the 'result' is only part of the problem of why the world is organized as it is. Our inability to answer that does not imply that we are any worse off in regard to mind than with other facts of quality that we accept without puzzle, satisfied if we can determine the *conditions* of their occurrence; and it does not follow that for this reason, mind must be something quite different from the rest of experience, provided that we realize that it presupposes sufficient organization and opportunities of work.

There is of course a certain justified longing for a working hypothesis concerning the rôle and position of mental activities, since without one few people can keep from drifting into misleading ruts of thought. A working hypothesis can, of course, not be expected to be more than an abbreviation of the available facts in simple terms. Any such abbreviation of the things as they are, especially in a complex field, will therefore try to say very simply what we know needs more amplification, and we inevitably must use terms which cover but relatively the general principle, especially if we are with necessity limited to expressing the whole *range* of mental functions with *one* mental reaction or thought or expression.

The question has so far come up chiefly in connection with the problem of animal psychology. Is there now, or will there ever be, any advantage in distinguishing mental and non-mental biological reactions? As soon as constellations arise such as we cannot express fully in any other but mental terms with our present knowledge, in other words, wherever we see steps of 'mental causation,' in the sense of assertion of biological energy with a conscious link, we have evidence of a special reaction-type. The easiest criterion of mental reaction is what we have in ourselves. We merely ask: has anyone ever experienced a given event as a mental one, and can it not also be conceived without the principles of mental activity?

The question of such criteria is a very young one. Loeb has used that of associative memory. He would take a certain activity or function to imply a mental character or to work with mental principles, if it implied evidence of *associative memory*. For a number of years I have used as a formula, under the heading of biological adjustments and elaborations, the concept of 'symbolization.' Mental reactions constitute a type of biological reactions which act as part of a *system of symbolization*, working through their *meaning* as well as

through the *direct* change they involve, a conjoint elaboration of needs of intercommunication between individuals, and, within the same individual, a complex interaction of various simultaneously occurring components, and the possibility of using the same symbols or reactions in the elaborations of constructive imagination, in the chronological memory-scheme, in the utilization of what is beyond immediate experience, etc. Through the unequaled role played by quality, as opposed to mere quantitative propositions, it is a marvelous saver of energy and the field of highest evolution. The reactions are essentially of one kind, as far as they make up consciousness or are parts of it; but, according to the special laws of their occurrence, they appear as 'sensations,' or 'ideas,' or 'memories,' etc., as adaptive reactions to situations, as 'volitions'; as dreams and wake-states; as part of direct effective activity or of thought. The theories concerning their organic foundation or the histological conditions for their occurrence are wholly inadequate; but we have no reason to think that the reaction, if it does occur, occurs otherwise than fulfledged, and that a division into a physiological part and a mental concomitant would be a complication which should not be accepted without better proof than can be given to-day.

It may be that the term symbol suggests too strongly the addition of a 'meaning.' The main point of the hypothesis is that it does away with parallelism, and forms a contrast between mental and non-mental biological functions without ripping apart the principle and the somatic reaction. The stream of mentation and the entire somatic activity as far as the stream of mentation forms its essential link, form the mental activity of the moment, and the only difference between the two extremes is the extent of collaboration of extra-cerebral mechanisms.

Such a hypothesis is perhaps unessential if we adhere to the principle that for the study of psychology, we must adhere to the events as they occur; we study these for what they do, for the conditions under which they arise and for the ways in which we can modify them.

The writings of Professor James, Professor Woodbridge and Professor Stratton and others mark a striking change in the consideration of the problem of conscious life. I should hardly have brought forth the above views but for the hope that some further helps may be elicited by them, in the adjustment of a great difficulty, the attitude of hopelessness about psychology and the even greater calamity of indifference and inaccessibility produced by dogmatic notions about science in physicians and others who should help us in building further in the evolution of practical experience.

PSYCHOLOGICAL LITERATURE.

APHASIA.

Revision de la Question de l'aphasie. La troisième circonvolution frontale gauche ne joue aucun rôle spécial dans la fonction du langage. PIERRE MARIE. Semaine Médicale, May 23, 1906.

Revision de la Question de l'aphasie. Que faut-il penser des aphasies sous-corticales (Aphasies pures)? PIERRE MARIE. Semaine Médicale, October 17, 1906.

Revision de la Question de l'aphasie. L'aphasie de 1861 à 1866. Essai de critique historique sur la genèse de la doctrine de Broca. PIERRE MARIE. Semaine Médicale, November 28, 1906.

Un Nouveau cas d'aphasie de Broca dans lequel la troisième circonvolution frontale gauche n'est pas atteinte, tandis que le ramollissement occupe la zone de Wernicke et les circonvolutions motrices. PIERRE MARIE and FRANÇOIS MOUTIER. Bulletins et Memoires de la Société médicale des Hôpitaux de Paris, February 13, 1907.

Sur un cas de ramollissement du pied de la 3e circonvolution frontale gauche chez un droitier, sans aphasie de Broca.[1] PIERRE MARIE and FRANÇOIS MOUTIER. Bull. et Mém. de la Soc. méd. des Hôp. de Paris. November, 1906.

A propos d'un cas d'aphasie de Wernicke considéré par erreur comme un cas de démence sénile. PIERRE MARIE. Bull. et Mém. de la Soc. méd. des Hôp. de Paris. February 1, 1907.

Sur la fonction du langage. Rectifications à propos de l'article de M. Grasset. PIERRE MARIE. Revue de Philosophie, 1907.

Since the publication of the review of the last contribution of Wernicke to our knowledge of aphasia (PSYCHOLOGICAL BULLETIN, July, 1905), a series of most interesting articles has appeared from the pen of Pierre Marie. They are entitled: 'Revision of the aphasia question,' and whatever the final result will be, they are not only a court of inquisition and a serious arraignment of medical logic and critical capacity, but a spirited call to a less dogmatic manner of dealing with the facts. A few years ago Nissl came out with a merciless exposure of the ease with which neurologists had handled their facts under the inspiration of the fascinating neurone theory.

[1] But with logorrhea and lesion of the foot of T_1.

As I showed in my review of his book (PSYCH. BULLETIN, I., 1904, p. 259) Nissl himself had built something like a glass house with his own theories, and while neither his critical analysis of the situation nor his positive claims should be surrendered to oblivion, his lesson will be chiefly a vigorous appeal for more scrupulous critique. Marie's 'revision' is based much less on constructive contentions such as Nissl's 'gray' or his independent fibers; but it also uses many new conceptions which have not failed to attract criticism, in which, however, more than one of his adversaries has been found napping.

Marie's views are based on over 100 cases of aphasia of which over 50 are with autopsies. In his marvelous service at Bicêtre he has over 30 cases of aphasia at a time. He early found a remarkable difference between his observations and the book descriptions, and before long he met with cases of 'motor aphasia,' without lesion of the Broca convolution, and cases with lesion of the Broca convolution without aphasia. Moreover, where the third, frontal was affected, he always found this lesion 'complicated' with other lesions, especially in the 'Wernicke zone,' and he came to the final conclusion that these 'complications' were the real lesion, and the Broca lesion an irrelevant coincidence.

The classical writers assume an auditory centre in which the images of words and tunes are deposited (in the posterior part of the first temporal gyrus), a center for visual word images (in the angular gyrus); and further a center for the motor images in the third frontal gyrus and a graphic center in the second frontal gyrus.

Marie denies outright the existence of an auditory word center in either the foot or the middle part of the first temporal; indeed, he considers the evidence for even a common auditory center in these parts as an unfounded product of anatomical notions. He also denies a visual center for words, a writing center and a motor word center. What has been interpreted as cortical and subcortical, complete and pure motor aphasia, agraphia and the various forms of word blindness and word deafness is all to be explained without the assumption of such special centers. *Pure word-deafness* (inability to understand words, with integrity of hearing and of spontaneous speech and integrity of reading and writing and of the intellect) he calls a myth. He says the few reported are all cases of certain forms of labyrinthic or other deafness, *i. e.*, of peripheral origin and not as Liepmann thinks due to a subcortical lesion in the temporal lobe. He even considers a general auditory center clinically unproved. What does occur, are cases with *difficulty of understanding of spoken words* due to a

lesion in the left hemisphere; but then it is a lesion of the '*zone of Wernicke*' which includes the cortex and underlying marrow of the supramarginal and angular gyrus and the posterior part of T_1 and T_2 —*i. e.*, a very roughly outlined portion of the hemisphere taken without any subdivision of the cortex or the fiber-paths, a product of the simplest anatomico-clinical analysis of autopsy material and free not only of speculation, but also of attempts of correlation with more or less established subdivisions of anatomical value. A lesion of these regions produces the syndrome of the true Wernicke aphasia, *i. e.*, jargon aphasia, more or less abolition of reading and writing and difficulty of understanding of spoken words. This difficulty or *intrinsic aphasia* is not due to a disorder of 'sensory word images.' The word-deafness is but rarely complete. Single words, short sentences and simple orders are usually understood (and by no means always only the same words from day to day); but anything complex leads to a very plain difficulty which, however, is not simply psychosensory, but denotes *an intellectual loss* different from other defects of intellectual efficiency by involving especially 'the stock of knowledge acquired by didactic procedures.' It is to the lesion of the zone of Wernicke that Marie ascribes this *defect of comprehension and of intellectual elaboration* which is said to constitute the *intrinsic aphasia*. The speech disorder is part of this *difficulty of elaboration, not a disorder of sensory reception*. This is a fundamental point, to be discussed further.

Marie similarly repudiates the sensory character of *word-blindness*. He has never seen a simple cortical lesion of the angular gyrus alone with suppression of reading. There are, to be sure, cases with derangement *chiefly* of reading; but Marie denies their being due to lesion of the angular gyrus, and insists on the fact that in these cases a lesion exists, not in the area of the Sylvian artery, but of the posterior cerebral artery supplying the mesio-ventral surface of the occipital lobe, but frequently extending slightly into the marrow or white substance of the Wernicke zone, *i. e.*, the lateral wall of the parieto-occipital lobe. This well known fact explains according to Marie how many of these cases may have not merely hemianopsia, but also some vague speech disorders in addition to their 'pure' word-blindness. But this is merely an anatomical issue and does not explain why the pure alexia when it does occur, should be considered merely as a 'defect of intelligence,' especially if the cases have otherwise little defect. What Dejerine tried to explain is the pure alexia (*i. e.*, simple inability to read, without inability to write) in the simple lesions of

the posterior cerebral artery and the progression of the case to an alexia with *agraphia* through addition of a lesion of the angular region. Marie leaves untouched the issue whether this additional agraphia through encroachment on his 'Wernicke zone' is to be explained as a mere effect of a diffuse intellectual disorder, or might after all point to a reading-writing mechanism. He introduces the term '*extrinsic aphasia*' to designate such a disorder as 'pure alexia,' and makes a strong point of the fact that it is 'rarely' pure, but usually part of a diffuse speech disorder.

The most telling onslaught refers to the so-called *Broca convolution*. In the very fascinating article on the history of the Broca convolution (*Semaine Médicale*, November 28, 1906), Marie furnishes us pictures of the brains of the original cases of Broca which are still to be seen in the Musée Dupuytren, without ever having been sectioned. In the famous case Leborgue, reduced to the recurrent utterance of a few syllables, the lesion of F_3 is merely the anterior part of a large focus which also destroys the central convolution and T_1, and part of the supramarginal gyrus. Under the influence of the discussion of the day which are sketched in a masterly picture and read like a novel, Broca paid attention only to the apparently deepest lesion in the 'anterior lobe.' His second case was probably merely one of senile dementia and senile atrophy, without any evidence of a hemorrhage or lesion (merely a depression with an arachnoid cyst). The subsequent casuistics brought many interesting contradictions, but somehow the dogma of a Broca convolution became established, as one of those evolutions of gregarious thought in a field where one individual has usually too little personal experience to feel the weight of all the pros and cons. Marie has collected a fair number of cases with 'Broca aphasia' without lesion of $L.F._3$, and cases of lesion of F_3 without speech disorder. F_3 is affected in about 50 per cent. of the cases of motor aphasia and that merely because the artery to F_3 is so often involved incidentally. If there is only occlusion of the artery to F_3 there is no aphasia; but usually the posterior branches are involved as well and produce the lesions which are necessary for inability of utterance and also for the involvement of the intrinsic functions of language. The arterial branch to the Broca convolution comes frequently not directly from the Sylvian artery but from the branch which also supplies the lower part of the central convolutions and with it the 'lenticular zone,' and not infrequently the subcortical substance under the anterior part of the Wernicke zone. Hence the great variation in the degree of general involvement.

It is odd that such a dogma as that of the Broca center should have survived with so little conclusive evidence. Was it the surgical experience especially with tumors which has made some inferences from the dogma appear useful when really the facts should be explained on a different basis? Or is it the hesitancy about publishing negative cases? or our tendency to adhere to didactically clear and easy points?

Since the studies of Dejerine, *motor asphasia* (see PSYCHOLOGICAL BULLETIN, II., p. 265) has been recognized to consist of difficulty or inability of initiation, but *also* some difficulty of understanding of spoken and written words and disturbance of the internal language. Marie considers this disorder of the internal language as the essential part of intrinsic *aphasia* and the motor disorder he calls *anarthria*, not to be confused with the anarthrias or dysarthrias of the cases of lacunæ or small foci of softening in the central ganglia or in palsy from lesion of the bulb, peripheral nerves or muscles of the larynx or mouth. It is produced by a lesion of what Marie calls 'zone lenticulaire' which, like the 'zone de Wernicke,' must be taken without regard for subdivisions. It comprehends (*Revue de Philosophie*, 1907) the caudate and lenticular nuclei and the external and internal capsules between two transverse planes marked exactly by the anterior and posterior ends of the island; while in a footnote of the article of October 17, 1906, the 'zone lenticulaire' is defined as consisting of the white matter between the insular gyri and the lenticular nucleus and the outer layers of the latter (and, in the case published with Moutier, the anterior two gyri of the island with the underlying external capsule were destroyed, without anarthria). A lesion in front of this zone produces neither aphasia nor anarthria; and to produce "aphasia," a lesion must extend back of this zone into the zone of Wernicke, most frequently in the white matter under the supramarginal gyrus. Marie arrives at the remarkably simple formula: *Broca aphasia = Wernicke aphasia + anarthria.*

Pure motor aphasia (without interference of internal language) becomes a simple *anarthria*, a term which from now on will have to be taken in this specific sense while dysarthria may remain as the expression of not specially linguistic, but general disorders of the movements of the speech organs, impediments of execution of well-planned efforts. *Anarthria, like alexia*, is not aphasia, but *an extrinsic disorder*, and it need not involve actual paralysis or motor disorder of the speech mechanism, but can occur independent of it, just as in many old persons a lacunar state of the brain can produce an inability to walk, without any real paralysis or contracture. Hence

'aphasia' and 'inability to speak without paralysis of the motor mechanisms' are by no means synonymous; and to explain the latter, Marie does indeed attribute a great importance to the lenticulo-striate body and its connections. Some of its lesions produce anarthria (*i. e.*, they involve what used to figure as the function of the Broca convolution), others ('especially the lacunar ones') pseudo-bulbar palsies, *i. e.*, essentially difficulty of execution of speech-movements with actual evidence of palsy of the mechanisms of enunciation.

Marie claims to stand on a ground free of hypotheses. He adheres strictly to the simplest clinical conceptions and the simplest most unsophisticated anatomical facts.

His conclusions may be summed up as follows: Aphasia is delivered of the cruder forms of the over-specialized concepts of word-notion and word-image. Language is essentially a unitary function, in some way depending on the integrity of the Wernicke zone. Its disorders are intellectual and not sensory. Besides these intrinsic disorders or aphasia there occur also extrinsic disorders, such as alexia in connection with lesions of the posterior cerebral artery, with varying involvement of the Wernicke zone, and therefore varying degrees of complication with 'aphasia'; and anarthria, referable to lesion of the lenticular zone and not to the Broca convolution, but also frequently encroaching upon the intrinsic language function, owing to spurs of softening into the white matter of the Wernicke zone.

As far as the distinction of intrinsic and extrinsic aphasia goes, Marie's expression is a decided simplification. Since the interesting study of Freud, there has been a strong tendency to speak of a 'speech-field' as a unit and to think of marginal regions as being involved in the 'pure motor' speech-disorders and the 'pure receptor' speech-disorders. Marie has limited the essential speech-field to the posterior part of Freud's speech-field and stands for a simple unanalyzed empirical cortical field with the underlying white substance. His claims that wherever intrinsic disorders of language existed, he found this zone involved, must be accepted until cases to the contrary can be brought forward. For this the methods of most investigators have been too superficial. Nothing short of serial sections of the entire brain will make a case convincing, and so far I cannot show a case in my extensive collection which could be offered as a convincing refutation of Marie's anatomical views, a result which may be due to the fact that all of my cases came from observations with distinct mental disorders, and specially diffuse lesions.

It is worthy of note that in 1881 Wernicke in his volume III., pp.

173, 176 and 179, concluded that the fibers from the third frontal gyrus to the bulbar nuclei must pass through the region of, or above the external capsule inward from the posterior end of the operculum since lesion of it entails 'motor aphasia.' He later adjusted this interpretation by assuming that these cases must have been cases of 'transcortical motor-sensory aphasia.' We must leave open the discussion of anarthria and its forms, especially since agraphia has not been considered specifically as yet in the light of Marie's conceptions.

The matter of greatest interest to the psychologist and to the clinician is the attitude of Marie concerning the *identification of aphasia and intellectual defect.* Dejerine says in one place that every aphasic has a defect of intelligence, and in another, that aphasia presupposed integrity of intelligence. It is evidently necessary to distinguish degrees and kinds of intellectual defect and it is questionable whether the expression is not altogether too vague. In this respect Marie superficially compares the intellectual defect of the aphasic with that of the victim of an early acquired infantile brain lesion, devoid of dementia in the ordinary sense but with simple diffuse reduction or restriction of educational capacity; and he contrasts this condition with that of a 'dement' and of a general paralytic. To consider the kind of reduction in the aphasic sufficiently characterized by calling it one of 'the stock acquired by didactic procedures' is very doubtful. To illustrate this defect Marie gives a very graphic account of an old moderately aphasic cook who showed no defect in his general demeanor, but blundered badly in frying an egg, and yet was quite pleased with his result. Are we not justified to ask: what is the relation of this slip to the aphasia? It would evidently look like a petitio principii to claim that the speech defect as such should be considered *the* intellectual defect in this generally reduced patient. Defects of speech resembling aphasia may be part of a dementia or of a general paralysis; in that case we have merely a symptomatic aphasia scarcely worth that name, with probable integrity of the speech mechanism, a deficient *use* of the tool; and in turn disorder of language will naturally interfere with those intellectual functions which usually or necessarily involve 'internal language,' without our having a right to incriminate the intellectual capacity generally. Moreover a lesion producing the speech-disorders may involve other functions apart from those of the language-thought function.

Intentionally or unintentionally, Marie does not draw into the discussion the recent studies on apraxia and asymbolia reported in previous reviews of the BULLETIN (II., pp. 278–282). It was and is

my conviction that the salvation of the complexity of the aphasia problem would come with a sensible subordination under the broader problem of faulty reactions generally and specifically those involving asymbolia and apraxia (PSYCH. BULL., II., p. 282, the two last paragraphs). Marie's 'stock of the things learned by didactic procedure' comprehends practically everything that may also be involved in the apraxias. Or is it perhaps unwarranted to claim that the apraxias are something worth specifying? And is the 'disorder of language' necessarily responsible in such defects as those of the cook?

On this point heuristic interests force me to respect the observations of Liepmann, Pick and others, and even to look for a direct application of the principles derived by them to the field of aphasia. And even didactically and for practical purposes, the principles are worthy of use in the radical elimination of the errors of the period preceding the Revision and the transvaluation of the facts which may stand the tests.

Marie has, inevitably to my mind, stirred up the conflict with the most serious crux of neurological psychology, viz., the problem of the position of sensation in the scheme of mental activity and therefore the relation of the 'sensory centers' to the 'intellectual processes.' Since Locke and Hartley the ground was prepared for a dissolution of mental processes into elements, and Marie's teacher Charcot strongly upheld the resulting atomism. Marie retracts from this artificial tangle, eliminates the supposed importance of the sensations, and designates his essential findings with the term 'intellectual defect.'

It is obvious that there *are* clean-cut mechanisms on the integrity of which the special types of *sensation* depend, and destruction of which slices from our capacity of mental activity or experience definite qualities or domains. We can reduce the capacity of visual experience by removal of one eye, one optic tract, one external geniculate body, one optic radiation, one calcarine area, or merely its more or less defined connection with the rest of the hemisphere or with the other hemisphere; or we can apply this process of reduction bilaterally and obtain at once absolute blindness, or merely limitations of the fields of vision and finally also an encroachment upon the utilization of previous visual experience, visual 'memory' and visual imagination and its use. Up to a certain point we speak of mechanisms of sensations, viz., as long as we deal with parts which are essential for the concrete object-experience; and the eagerness for psycho-physical correlation has led to the identification of certain parts with the actual sensations. The fibers are, of course, merely conductors, but the

places of synapses are considered as possible centers. The first probable station of 'visual sensations' is the calcarine cortex; beyond that begins the controversy over special memory centers. In all these matters popular and scientific generalization has rushed far beyond what counts as safe ground. The calcarine cortex is a place destruction of which assures hemianopsia; but that does not mean that the calcarine cortex is the 'seat of the sensation,' or at least that it 'sees' any more than the retina sees. All we know is that the person as a whole sees, as part of that unit which we can also designate as the stream of consciousness, and subdivide into functional subunits or mental complexes. The subdivision into complexes according to anatomical centers yields quick results which, however, brings disadvantages to current medical psychology and those who copy from it. It tempts one to accept correlation of atomistic mental elements (the results of logical analysis) with physiological and anatomical fragments. This atomism is contrary to actual clinical and anatomical experience. It populates the brain with fictitious sensations and memories of sensation without regard for the actual functional events.

Marie correctly sees in the intrinsic disorders of language a disorder not of sensation but of comprehension and elaborations. He says in his reply to Grasset: The speech-disorder in lesion of the Wernicke zone is due to a disorder of intellectual elaboration and not, as the authors say, to a disorder of sensory reception. The question then arises: Where does the intellectual elaboration begin and, further, is there any hope of better differentiation of the 'stock of the things acquired by didactic procedure'—a domain which includes so many things outside of what would be involved in speech-disorder. Marie knows of but one intrinsic aphasia, a more or less in quantity, according to the amount of tissue disabled in the Wernicke zone. How are we going to size up the *qualitative* differences between the cases?

Wernicke and others have long used such a distinction as primary and secondary identification of impressions instead of sensation and perception. Instead of this it may even be better to recognize more stages of a hierarchy, such as simple realization, understanding (or realization of wider relations), and utilization. Where does sensation cease and where does intellect begin? A decision would be quite arbitrary. We certainly have altogether too little knowledge of observation to decide it, and it becomes even questionable whether any gain can come from attempting a clean-cut subdivision. We are more and more forced to the conception that the specific nature of sensation is not to

be found in any special mental quality, but in *extrinsic* and nevertheless most essential facts: a sensation differs from other mental processes by the relation to objects, the participation of definite sense-organs, and of parts of the nervous system which could not simultaneously be used by other impressions without altering the adequate accompanying mental reaction. The mental quality of sensation in dreams and hallucinations does not differ fundamentally from 'real sensations' except through the extrinsic situation and the difference in possible connections and elaborations. The 'sensations' of dreams are sensations and 'real' only because the situation does not disturb the trend of mentation sufficiently to precipitate conflicts and the realization of a disharmony. On the other hand, in a waking state the mental adjustment to impressions is so alert and perfect that we at once identify the most essential types of adjustment or *reaction* with the process of *impression*, because that is the thing to be noticed and more likely to become a topic of thought and words because it is common-ground for everybody.

There is no end of extending the sensory character of all mental experience on the part of those who find it convenient to operate with sensations. Emotion becomes visceral sensations, and thinking sensations of an inner sense, until we have successfully reached an exclusive system of associations of sensation and their memories with at least the appearance of a common denominator. A large number of our mental reactions must be pictorial and instantaneous reactions or elaborations or whatever we wish to call the 'adjustment of understanding'; they must be adaptation to rapidly changing outside relations with minimum alteration of ourselves; special circumstances make them 'sensory.' Other reactions are more essential in activities, and were formerly specified as volitional; but here the extrinsic facts are so little obtrusive that there is no regret over the fact that volitions have ceased to be singled out from the other mental activities. The main fact about volition is again the occurrence of the 'mental ajustment' under appropriate *conditions* and with appropriate *results*, and the organic links are so personal and, like the cerebellar function, so much part of the machinery of our own organism, that they do not tend to have specific mental equivalents or to call for their invention as where we call mere impressions 'subconscious sensations'; they are of no importance for interchange of thought and mental realization. Abolition of sensation is evidently extraneous to mental function, unless it is really a disturbance of understanding (*i. e.*, broader realization) or capacity of utilization. Sensation, identification and elaboration after

all are terms covering the entire field from simple realization to utilization and between them there is no sharp line. The whole is finally summed up under the general biological conception of capacity and activity of *adjustment*, and we study in aphasia the inadequacy of those adjustments which involve the activity of the language-mechanisms, and their relation to inadequacy of adjustment in other domains of mental activity, such as that of direct activity not implying speech.

There is, in the tendency of Marie, a certain danger of going from one extreme to the other. The atomistic psychologies have probably erred in putting all the weight even of elaboration on the receiving centers. On the other hand, there is no end to regression to a final abstract and thoroughly expurgated intellectualistic standpoint, if one pushes Marie's simplification of a 'global intellectual function' to an extreme. We have not the slightest idea as yet how the elaboration takes place, to what extent it is made up of global waves spreading from the receiving stations into 'coagitation-fields' of no longer 'sensory' character as Flechsig seems to suggest, or whether more specific reaction paths exist. (Marie has added relatively simple tests of 'coagitation' to the current tests of mental examinations of aphasias in the form of compound orders, such as — "here are three unequal pieces of paper on this table, give me the largest one, tear up the middle one and throw it on the floor, and put the smallest piece in your pocket," or "get up, go and knock three times at the window with the finger, then come back in front of the table and walk around your chair and then sit down.")

We now turn briefly to some valuable studies in the psychology of aphasia, undertaken by Marie with Vaschide.

The first study[1] is made with D'Arsonval's chronoscope and simple reactions and reactions to one of two noises of equal intensity but different quality (table and china). The tests are three seconds apart. The figures are the average of 20 successive reactions. The adequate training is rather difficult and the assertion of understanding of what is wanted very deceptive.

	Simple reactions.		Choice reactions.	
	Rapidity.	Variation of average.	Rapidity.	Variation of average.
Mich.	37.8	4.61	38.2	4.13
Barn.	15.5	1.4	20.6	4.99
Perr.	27.9	5.9	54	10.85
Bloch.	19.2	1.2	84.3	39.1575

[1] 'Recherches expérimentales sur la vie mentale des Aphasiques. La vitesse des temps de réactions auditives chez quelques Aphasiques,' *Rev. Neurologique*, XI., 1903, pp. 228–231.

In Mich., who appears like an average normal person, the internal language is almost intact, also in Bloch, who is distracted and does not see well; in Perr., who appears vivacious, it is reduced to motor images poor in qualitative epithets; in Barn., it is practically abolished, and yet he looks bright and intelligent. The first three cases have long been hemiplegic and reacted with the normal hand.

In the simple reactions, Barn. and Bloch react fairly promptly, with moderate variations, but at least Bloch with some evidence of distraction; the other two are easily side-tracked, slow and with wide variations.

In the choice reactions Mich. reacts correctly and as rapidly as with the simple reactions. Barn. reacts promptly, but only once in ten reactions did he distinguish the correct and the incorrect response, although he distinguishes the noises. He anticipates continually, and the good and bad reactions rate with 20.6 and 21.2 respectively. He belongs to the motor type. Bloch is at least conscious of the difficulty, but develops marked automatism. Perr. (visuo-motor) distinguishes poorly and has a kind of motor abulia.

The slowing is far in excess of any receptive disorder. It involves the elaborations. The automatism shown is strikingly motor, and not a sensory reaction.

The account contains a brief statement of the introspective and motor analysis, but no account of the actual aphasic disorder.

The second study refers to the immediate memory ('Recherches expérimentales sur la Mémoire immédiate des Aphasiques,' *ibid.*, pp. 322–323). The rough memory was tested by series of sounds, numbers, syllables and words (with or without sense, nouns, adverbs, verbs, etc.), read at the rate of one a second and repeated immediately. Eight patients were tested for six weeks and again after a month. One of them was a traumatic aphasia. The defect proved very marked. None remembered more than three and maximum four tests of a series. Verbs were best remembered; next the words of emotional or indefinitely intellectual nature; the others met much more rapidly with exhaustion of attention. The traumatic case was but little reduced, remembered four–five numbers, syllables or sounds — evidence that quite a little of the disorder in the others is from diffuse disturbance?

According to the third communication ('Recherches sur l'association des idées chez les Aphasiques,' *ibid.*, pp. 722–724), the association tests (on nine cases) brought out almost complete absence of response in most cases. The unadorned test-excitation has no dynamogenic

value. Contiguity or similarity have hardly any influence. With effort, a memory or some conclusion may be obtained. Even in one to two minutes the patient repeats the same word distractedly and helplessly. Association of actions was equally poor, and in the small numbers in which they succeeded, an unanalyzed execution of the whole act. The traumatic case again approached the normal condition.

Without a full report of the cases, these results naturally tell little with regard to the issue of relation of intellectual and language defect. It is obvious to any one familiar with the issues of aphasia-examination that much more pointed and discriminative tests are needed beside these general ones, and that the interesting contrasts of specialized defects of language reported in Bastian's collection cannot cease to be suggestive of further subdivision of 'global function.' In such a domain as alexia there remains a need of further explanation of the peculiar series of effects of lesion in the visual zone: simple right hemianopsia without alexia, then with alexia without speech-alteration, then such involvement as will imply agraphia, but so little general speech-defect that one cannot very well speak of a 'global disorder.' How is it that the 'intellectual center' fails to cope with word-vision and writing while it still gets along with word-hearing?

Marie does not altogether escape the tendency to bring in arguments extraneous to the anatomo-clinical field to which he professes to adhere. In the discussion of alexia he draws in the argument that evolutional grounds justify the expectation of a specialized (strictly one-sided) 'center' of spoken language in the sense of a specialized mechanism of elaboration; reading and writing are, however, too recent an acquisition to figure as an actual center. These evolutional arguments are, however, rather irrelevant, and as little convincing as they were in 1897 when Marie first published them. It may be plausible to exclude on this ground the word-vision center, but it does not elucidate the intelligence center in the left posterior association center of Flechsig until we shall actually be able to show a difference between the left and the right hemisphere in this region. Since this is not accomplished satisfactorily the whole question of 'centers' had best rest. Dejerine's visual word center in the angular gyrus is not improbable 'owing to simple logic' but owing to lack of evidence, and owing to the inadequacy of all of our present center-notions.

In other ways as well it would be better to pay more attention to some really accessible anatomical controls. The nonacceptation of a general hearing station is not easily understood in the face of very fair facts, and the pertinent controversy (October 17, 1906, p. 493) not

wholly without some haziness. It is difficult to accept Marie's statement, that there is a special tendency to assume a cerebral affection of hearing *especially* if it is associated with disorders of equilibrium. In this case one would more probably look for labyrinthic disorders. Further, while Marie refutes the idea of deposits of word-images, which would have to result in the formation of veritable mushrooms in polyglots, he suggests *syllabic mechanisms* in a receiving center. Has he perhaps observed a case of aphasia with isolated loss of definite syllables?

The examination of cases of cerebral lesions demands a systematic plan and it is not easy to see how we can at present improve on the following: We test the capacity of reaction in each of the receptive functions: the extent of crude simple reaction (auditory, visual, tactile, etc.), the extent of graded elaboration from the material of each field into the channels of possible elaboration: spoken and written language, activity in the form of elaboration of orders, and utilization of combination of senses, and for each of these fields it is necessary to test various grades of elaboration. For a clinical and psychological analysis, Liepmann's plan (PSYCHOLOGICAL BULLETIN, II., p. 280) had best be applied to each series.

The *diagnosis* for practical purposes will have to determine the material for reconstructive reëducation (for this there is practically no material with accurate autopsies) and the anatomical diagnosis depends largely on features extraneous to the intrinsic speech-disorder itself — the extent of receptive and of emissive (anarthric) disorders, and their relation to crude receptive and hemiplegic disorders, etc.

An examination of concrete cases weans one of the idea that the foundations of the generalizations about the brain are so safe as dogma will have it. Untiring labor will be required to build further: above all things a sufficient number of cases which are complete in most respects, and less juggling of incompletely correlated half-observations. That cases of operative clearness, such as traumatisms, will ultimately have to decide many issues, becomes fairly plain from Marie's psychological experiments, and these cases are extremely rare and worth the most careful record and communication.

Doctrine de l'Aphasie Conception Nouvelle. Dr. BERNHEIM. Nancy. Paris, O. Doin, 1907.

Bernheim has also repudiated the existence of a special auditory or visual speech center. There are only centers for the crude sensory impressions. Visual and auditory memory images are like all phe-

nomena of consciousness evoked in *the psychic sphere, the frontal lobe.* There is no representation by individual cells but the same brain cell can serve for various sensory conceptions. A lesion of the first temporal gyrus or of the connections of the visual lobe interrupts the action on the frontal lobe which does not any longer evoke the memory of the word and of associated interpretation. The words which are forgotten vary from day to day. The work of the so-called motor and graphic word centers is done under the direction of the auditory or graphic word-images elaborated in the psychic sphere through fibers of the internal capsule to the bulbar and spinal mechanisms. The aphasia with or without agraphia produced by lesion of the Broca region is not due to destruction of a center but to destruction of the connection between the psychic sphere and the auditory and visual centers and the spinal-bulbar mechanisms. Motor aphasia and agraphia are therefore always 'subcortical' and they occur at times independently because the two have not the same mechanism of formation nor the same path of transmission.

We need hardly point out that B. operates with a number of conceptions which would be difficult to substantiate.

APRAXIA.

Beiträge zur Apraxielehre. F. HARTMANN. Monatsschrift f. Psych. u. Neurolog., Bd. XXI., pp. 97–118, and 248–270.

In connection with the discussion of Marie's center of the 'stock of things acquired by diadactic procedures,' Hartmann's recent study is of interest as an apparent vindication of functions of the frontal lobe. It is reported here especially because of its emphasis on a methodical issue, viz., the study of the 'stream of activity' or Bewegungsablauf, rather than mere isolated tests, and the importance given to the collaboration of support or stimulation from several sensory fields.

Hartmann furnishes first a description of three cases, one of lesion of the left frontal lobe exclusive of Broca's region, the second a tumor of the posterior two thirds of the corpus callosum, with interesting dissociation of movements of the two sides, and one of hemorrhage into the middle of the right frontal gyrus. He discusses the left frontal lobe and its probable rôle in serial movements or the stream of activity (Bewegungsablauf), the importance of the corpus callosum in apractic disorders and the rôle of the right frontal lobe for the stream of activity.

His conculsions are as follows: Within Flechsig's anterior association center there must be mechanisms not so far outlined which are

inserted in the mechanism of motor cerebral activity and have the same relation to the motor centers of the extremities which the Broca region has for the dynamics of motor speech function.

The impetus to serial movements from the various sensory spheres of the cerebrum demand the coöperation of the frontal lobe for the imparting of their impulses on the motor zone.

The elimination of this function in the *left frontal lobe* leads to motor mind palsy of the opposite extremities (total apraxia).

The *right frontal lobe* requires the coöperation of the left hemisphere and connection with its sensory spheres in order that serial movements or the stream of activity be appropriately guided. Where the left *frontal* lobe alone is shut off from the right one, there is a loss in the continuity of chiefly those left-sided series of movements which depend on memory.

Where a greater part of the callosum is eliminated a conduction-apraxia of the left extremities with preserved memory of movements is the result.

The higher motor functions of the hemispheres when separated from each other show a difference on the two sides. The isolated left hemisphere merely requires an increased perceptive control of the serial movements by the sensory systems; the right side, however, becomes apractic but for its 'Eigenleistungen,' or autochthonous reactions, and the capacity for imitation of passive movements of its extremities. Complicated series of motions which depend on the coöperation of the two sides (bimanual and static-locomotor series) depend on the integrity of the interhemispheric association systems.

Defects of the right frontal lobe (marrow of $R.F._1$) produce symptoms of partial conduction apraxia of the left side of the body with preserved motor memory.

According to these views the human frontal lobe would preside over movements of a higher dignity and complication, which in lower vertebrates would be provided for simply by the motor center.

A consideration of the cases shows how very difficult it is to determine how much the general initiative of the patient has suffered and to what extent the effect of a simple impediment in one type of reaction might easily impress one as a special defect in a supposed controlling mechanism. In view of the general tendency towards caution, the chief gain lies in the formulation of a more searching analysis of the sequences of motion.

DEMENTIA PRECOX.

Ueber die Psychologie der Dementia Præcox. Dr. C. G. Jung. Halle, C. Marhold, 1907.

The fruit of three years of experimental work and clinical observations, this study represents the most comprehensive analysis of the interesting set of phenomena of a very frequent type of disorder, which tends in a large percentage of the cases to blocking of further development and oftener to actual deterioration. It deals with the descriptive analysis and reconstruction of the manifestations and furnishes a very striking corroboration of Freud's principles of the processes in hysteria in this field.

Jung gives an excellent review of the existing literature. Throughout, there is a tendency to point to a specific *central* disorder, described with various terms; apperceptive deterioration (Weygandt), dissociation and abaissement du niveau mental (Janet-Masselon); decay of consciousness and dementia sejunctiva (Gross), decay of the personality (Neisser). Masselon and Neisser emphasize the tendency to fixation, and Neisser connects with it the emotional deterioration; Freud and Gross mention dissociated complexes, and Freud was the first to demonstrate that the same principles hold as in hysteria. The fixation of the complex and the deterioration in these cases would point to special effects of the affect (toxines?); but there is no reason to deny that such a fundamental change of metabolism might also come on as the primary factor and merely utilize existing complexes.

The first chapter contains many good analyses of work on associations by Pelletier, Stransky, Heilbronner, etc., and a review of the case of paranoid dementia analyzed by Freud.

The second chapter is devoted to the affective complexes and their general effect on the psyche, and the third one, to their influence on the quality of association; and in the fourth Jung gives a comparison of dementia præcox and hysteria. Finally he furnishes a full account of the analysis of a chronic and very complex case of paranoid dementia.

The whole work is a decided amplification of Freud's views, and must be studied in full as one of the best applications of the method. In the main, it is occupied considerably with explanation of the qualitative determination of the delusional and other developments, and hardly with the primary foundation of this type of developments in terms of habit-disorders. But his studies illustrate plainly how the type of abnormal trends of thought is not merely an illustration of

the downward course, but *as such* destructive and undermining. While the mechanism in hysteria and in dementia præcox is in many ways the same, the material with which the two work is strikingly different; and if we attribute a relative causal value to the complex in hysteria (in the sense in which we attribute a psychodynamic value to suggestion), we may possibly not be surprised that so-far special toxins have not been found in dementia præcox, in as much as the constitutional make-up of the patient at the time of the outbreak and the kind of developments go a long way to account for the subsequent course of events. The durability of the automatisms and tendency to fixation seems best explained by the *qualitative difference of the material* in the two states. That they imply changes of metabolism would oftener seem incidental to the process than an original factor; in other words, it is the kind of concrete doings of the patient and the capacity and elasticity of his organism, and neither disorder of metabolism nor an abstract mental formula, that will bring to us the material for action and interpretation. The best kind of interpretation is the one that can claim to be the expression of successful action. So far the correction of some somatic incidents may have yielded the best, although but meager results. The difficulty of accessibility during many of the actual outbreaks and the usually hopelessly difficult constellations may deter further from a more rapid acceptation of a saner utilization of the dynamic issues in the mental sphere. But a wider and deeper knowledge of the not infrequent transient episodes of the 'dementia præcox' type will probably break down more readily than the analysis of a chronic case, the stubborn aversion against studying the mental life of such cases as we study disorders of respiration or metabolism or other disorders of the biological economy as types of activity with flesh and blood and at the same time with valuable points of attack observable and utilizable only in terms of mental habits and ways of digestion of mental experiences.

As a guide to some system in the sizing up of central complexes and the protean manifestations, and a most valuable extension of a dynamic psychology, Jung's work is a great achievement.

ASSOCIATION.

On Psycho-physical Relations of the Association Experiment. C. G. JUNG. Jour. of Abnormal Psychology, Feb., 1907, p. 247.

In connection with his further studies in association Jung reports some interesting experiments in which he has very cleverly made use of the so-called 'galvano-psycho-physical reflex.' Veraguth reported

in 1906 upon certain phenomena observed in a highly sensitive galvanometer when a low tension current is allowed to pass through the human body, the points of contact being the palms of the hands. When various stimuli were applied to the subject (tactile, optic, acoustic) it was found that the galvanometer indicated a lowering of the electrical resistance of the body not in direct relation to the strength of the irritation, but more especially in proportion to the intensity of the resulting psychical feeling tone; it was further noted that the variation in the galvanometer did not appear at the moment of the perception of the stimulus but after a latent period of a few seconds. It was later discovered that it was not necessary to actually apply a sensory irritation; for the galvano-metric oscillations occurred when the subject was merely led to expect a stimulus. From these observations Veraguth concluded that in this experiment the feelings were objectively represented.

Jung has perfected a means of representing graphically the oscillations of the needle on a revolving drum and in this way curves are traced on smoked paper. The subject is given the stimulus words as in the usual association experiment;[1] a pretty uniform tracing is obtained until some complex of ideas associated with strong affect is touched upon. Then there occurs a deviation of the needle in the galvanometer and a corresponding rise in the curve traced on the drum. As examples some curves obtained during the association experiment are reproduced together with brief histories of the cases to show that the psycho-analysis pushed along the lines suggested by the variations in the curves lead to the discovery of certain strong emotional complexes. Jung believes that these experiments afford a means of demonstrating the feeling tones which accompany the associations. The physical and physiological principles involved are hidden in obscurity. G. H. KIRBY.

NERVOUS SYSTEM.

The Integrative Action of the Nervous System. CHARLES S. SHERRINGTON. New York, Charles Scribner's Sons, 1906.

Zur Analyse der Reflexfunctionen. Eine kritische zusammenfassende Darstellung. SILVESTRO BAGLIONI. Wiesbaden, J. F. Bergmann, 1907.

These two works present from different standpoints some fundamental facts of nervous function, Baglioni proceeding from the spinal

[1] For reviews of Jung's work in this field, see analysis by Adolf Meyer, PSYCHOLOGICAL BULLETIN, 1905; also a review by August Hoch, *Journ. Abnormal Psychology*, Vol. I., No. 2.

frog and experiment on cephalopods, Sherrington viewing the mammalian organism as a whole and studying the mechanism of the reflexes and their welding together into the biological unit, described as integration of activities.

Baglioni gives a brief but excellent picture of the multiplicity of the real reflexes and their distinction from mere electrical stimulation of the nervous system, and the necessity of considering as essential the adequate stimulus of the peripheral organ. The reflex mechanism consists of the motor or efferent elements, and of the coördination mechanism, consisting of all the other central and the afferent elements. In phenol he has found a poison selecting the motor elements, whereas strychnine is shown to be a poison of the coördinatory mechanisms. The fact that the increased excitability produced by strychnine leads to no automatic discharges, speaks strongly against the conception of absolute automatism. The book is well written and so concise and rich in excellently chosen material to lend itself to a brief review.

With a somewhat complex nomenclature, but with a standpoint which should appeal to the psychologist, Sherrington gives a review of a large array of facts of nerve-physiology which can safely be called the best and broadest collection of first-hand experimental studies on higher vertebrates available to-day. Instead of building up the animal out of elementary reflex units, he aims to show what constitutes the individual and how the parts are welded together. The result is an open-mindedness for those processes which cannot be reached as yet by ordinary neurophysiology, but which form an intrinsic part of what interests one beyond neurological issues.

The psychologist is already familiar with his interesting experiment in eliminations of the visceral sensations from emotional reaction in the dog, and the most interesting study of the independent appreciation of binocular stimulation. The systematic elaboration of the whole material gives a picture which forms a striking contrast to the traditional simplicity. The work is to such an extent bound to be the guide in this field that an abstract is unnecessary.

BOOKS RECEIVED FROM MAY 5 TO JUNE 5, 1907.

L'Évolution créatrice. H. Bergson. Paris, Alcan, 1907. Pp. viii + 400. 7 fr. 50.

Zur Einteilung der Wissenschaften. C. Stumpf. Aus d. Abh. d. k. P. Akad. d. Wiss., 1906. Berlin, Kön. Akad. 1907. Pp. 93.

Erscheinungen und psychiche Functionen. C. STUMPF. The same, 1907. Pp. 40.

Der Kritische Idealismus und die Reine Logik. W. JERUSALEM. Wien u. Leipzig, Braumüller, 1905. Pp. xii + 226.

Lehrbuch der Psychologie. W. JERUSALEM. 4to Auf. Wien. u. Leipzig, Braumüller, 1907. Pp. xii + 213.

Psychologique du Nombre et des Opérations élémentaires de l'Arithmetique. S. SANTERRE. Pref. by P. JANET. Paris, Doin, 1907. Pp. xiv + 178.

Vortex Philosophy or the Geometry of Science. C. S. WAKE. Chicago, the Author, 1907. Pp. 36.

Interpretaciones sociales y éticas del Desenvolvimiento mental. J. MARK BALDWIN. Trans. by A. POSADA and G. J. DE LA ESPADA. Madrid, Jorro, 1907. Pp. 579.

NOTES AND NEWS.

As a memorial to Paul Julius Möbius, Dr. Bresler, Professor Edinger, Professor Moeli and others are establishing a Möbius fund, the interest of which will be used annually as a Möbius prize for a worthy piece of work from the field of neurology or psychiatry, one year a contribution on an assigned topic, to be published in the Psychiatrisch-Neurologischen Wochenschrift; and the other year for the most worthy article or monograph on psychiatry or neurology published during the previous two years. Contributions or promises of the same are to be directed to Curt Reinhardt, Leipzig, Lessingstrasse.

A German edition of Professor Baldwin's *Thought and Things* is announced by Herrn Barth of Leipzig. The first volume is being translated by Wm. F. G. Geisse and will appear in the autumn. A Spanish translation of the same author's *Social and Ethical Interpretation* has just appeared from the press of Jorro of Madrid, done by the eminent Spanish sociologist, Professor Posada.

At the recent celebration of the centennial anniversary of the founding of the University of Maryland, the honorary degree of LL.D. was conferred upon Presidents F. L. Patton of Princeton Theological Seminary and G. Stanley Hall of Clark University, who were also the principal speakers.

Dr. W. D. Furry Ph.D. (J. H. U.) has been appointed Johnston Research Scholar in the Department of Philosophy of the Johns Hopkins University.